We claim:

1. A method of communicating over a communications channel comprising:

receiving a received signal that includes a remotely transmitted signal, where said remotely transmitted signal is in a given frequency band; and

transmitting, concurrent with said receiving, a locally transmitted signal in said given frequency band, where said locally transmitted signal is substantially orthogonal to said remotely transmitted signal.

2. The method of claim 1 wherein said remotely transmitted signal has a first set of sub-carrier center frequencies, characterized by a presence of signal, and a first set of zero signal frequencies, characterized by an absence of signal and said transmitting comprises transmitting said locally transmitted signal having a second set of sub-carrier center frequencies and a second set of zero signal frequencies, where said second set of sub-carrier center frequencies correspond in frequency to said first set of zero signal frequencies and said second set of zero signal frequencies correspond in frequency to said first set of sub-carrier center frequencies.

3. The method of claim 2 wherein said locally transmitted signal has a predefined symbol duration and said sub-carrier center frequencies in said second set of sub-carrier center frequencies have a frequency spacing equal to the reciprocal of said symbol duration.

4. The method of claim 2 wherein said second set of sub-carrier center frequencies is interleaved in frequency with said first set of sub-carrier center frequencies.

5. The method of claim 4 further comprising assigning an integer index to each sub-carrier center frequency in said given frequency band, wherein said first set of sub-carrier center frequencies have odd indices and said second set of sub-carrier center frequencies have even indices.

6. The method of claim 4 further comprising:

determining an amount of downlink traffic in said locally transmitted signal;

determining an amount of uplink traffic in said remotely transmitted signal; and

determining a traffic ratio, where said traffic ratio is a ratio of said amount of downlink traffic to said amount of uplink traffic;

wherein a ratio of a number of center frequencies in said first set of sub-carrier center frequencies to a number of center frequencies in said second set of sub-carrier center frequencies is proportional to said traffic ratio.

7. The method of claim 4 further comprising, for a given symbol, selecting said second set of sub-carrier center frequencies from a transmitter pseudo-random set of candidate center frequencies, where said transmitter pseudo-random set of candidate center frequencies is non-overlapping with a receiver pseudo-random set of candidate center frequencies.

8. The method of claim 7 further comprising switching said pseudo-random sets of candidate center frequencies to new sets such that, for a subsequent symbol, selecting said second set of sub-carrier center frequencies from a new transmitter pseudo-random set of candidate center frequencies, where said new transmitter pseudo-random set of candidate center frequencies is non-overlapping with a new receiver pseudo-random set of candidate center frequencies.

9. The method of claim 8 wherein said switching to said new sets follows a pseudo-random pattern known to a transmitter of said locally transmitted signal.

10. The method of claim 2 further comprising:

obtaining a Fourier transform of said received signal;

determining, from said Fourier transform of said received signal, frequency values of said first set of zero signal frequencies; and

adjusting said second set of sub-carrier center frequencies to correspond in frequency to said first set of zero signal frequencies.

11. The method of claim 2 further comprising:

determining a symbol timing offset from said remotely transmitted signal; and

adjusting a timing of symbols in said locally transmitted signal based on said determining.

12. The method of claim 1 further comprising:

generating an error signal from said locally transmitted signal; and

subtracting said error signal from said received signal to suppress elements of said locally transmitted signal in said received signal.

13. The method of claim 12 wherein said generating comprises attenuating said error signal.

14. The method of claim 12 wherein said generating comprises developing a composite of multiple attenuated and phase shifted copies of said locally transmitted signal.

15. The method of claim 12 further comprising:

detecting an amount of said locally transmitted signal in said received signal; and

based on said detecting, adjusting said generating to further suppress said elements of said locally transmitted signal.

16. The method of claim 15 where said detecting comprises:

obtaining a Fourier transform of said received signal; and

determining, from said Fourier transform of said received signal, power levels at said second set of sub-carrier frequencies.

17. The method of claim 16 wherein said adjusting said generating is based on said power levels.

18. The method of claim 1 wherein said remotely transmitted signal is encoded using a first code and said transmitting further comprises encoding said locally transmitted signal using a second code, where said second code is substantially orthogonal to said first code.

19. The method of claim 18 wherein said first code and said second code are orthogonal spreading codes.

20. The method of claim 19 wherein said orthogonal spreading codes are based on Walsh functions.

21. The method of claim 1 wherein said communications channel is a wireless communications channel.

22. The method of claim 21 further comprising:

estimating characteristics of said communications channel in said given frequency band based on said received signal; and

adjusting said transmitting based on said estimated characteristics.

23. The method of claim 22 further comprising obtaining a Fourier transform of said received signal, where said estimated characteristics are based on said Fourier transform of said received signal.

24. The method of claim 23 further comprising recognizing a pilot signal in said Fourier transform of said received signal, where said pilot signal is remotely transmitted at a predetermined frequency and modulated in a predetermined pattern.

25. The method of claim 22 wherein said adjusting said transmitting comprises adjusting a transmission power level.

26. The method of claim 22 wherein said adjusting said transmitting comprises adjusting a modulation technique.

27. The method of claim 22 wherein said adjusting said transmitting comprises adjusting a coding technique.

28. The method of claim 22 wherein said adjusting said transmitting comprises adjusting an antenna beam tracking technique.

29. The method of claim 22 wherein said adjusting said transmitting comprises adjusting a space-time coding technique.

30. An apparatus for communicating over a communications channel comprising:

a receiver adapted to receive a received signal that includes a remotely transmitted signal, where said remotely transmitted signal is in a given frequency band; and

a transmitter adapted to transmit, concurrent with said receiving, a locally transmitted signal in said given frequency band, where said locally transmitted signal is substantially orthogonal to said remotely transmitted signal.

31. An apparatus for communicating over a communications channel comprising:

means for receiving a received signal that includes a remotely transmitted signal, where said remotely transmitted signal is in a given frequency band; and

means for transmitting, concurrent with said receiving, a locally transmitted signal in said given frequency band, where said transmitted signal is substantially orthogonal to said remotely transmitted signal.

32. A radio communication system comprising:

a base station including:

a base station receiver adapted to receive a base station received signal that includes a mobile terminal transmitted signal, where said mobile terminal transmitted signal is in a given frequency band; and

a base station transmitter adapted to transmit, concurrent with said receiving, a base station transmitted signal in said given frequency

band, where said base station transmitted signal is substantially orthogonal to said mobile terminal transmitted signal;

a mobile terminal including:

a mobile terminal receiver adapted to receive a mobile terminal received signal that includes said base station transmitted signal; and

a mobile terminal transmitter adapted to transmit, concurrent with said receiving, said mobile terminal transmitted signal.

33. The radio communication system of claim 32 wherein said given frequency band is divided into a plurality of sub-carrier center frequencies, said base station is allocated a first sub-set of said plurality of sub-carrier center frequencies on which to transmit and said mobile terminal is allocated a second sub-set of said plurality of sub-carrier center frequencies on which to transmit, where said first sub-set and second sub-set are mutually exclusive.

34. The radio communication system of claim 33 further comprising:

a controller unit adapted to:

measure a traffic flow from said mobile terminal to said base station and from said base station to said mobile terminal;

re-allocate said plurality of sub-carrier center frequencies to a new first sub-set and a new second sub-set based on said measuring; and

communicate identities of said sub-carrier center frequencies allocated to said new first sub-set and said new second sub-set to said base station and said mobile terminal.